

INSPECTION REPORT
Torrance Refining Company, LLC
CAA Section 112(r), CERCLA Section 103 and EPCRA Section 302-312

<i>Stationary Source</i>	Torrance Refining Company, LLC
<i>Date of Investigation</i>	11/01/2016 – 11/04/2016
<i>USEPA Contact</i>	Jeremy Deyoe, EPA Region IX
<i>Description of Activities</i>	Opening meeting with facility representatives Inspection consisting of the following activities: - Credentials presentation and opening conference - Document review - Field verification - Personnel interviews - Closing meeting with facility representatives
<i>Investigation Participants</i>	Jeremy Deyoe (USEPA Region IX) Cyntia Steiner (USEPA Region IX) Don Nixon (USEPA Region IX) Anthony Gaglione (ERG) Mark Briggs (ERG) David Dumais (Torrance Fire Department) Steve Tsumura (South Coast Air Quality Management District) Rudy Chacon (South Coast Air Quality Management District) [REDACTED] and additional participants (TRC) (see sign in sheet)

Stationary Source Information

<i>USEPA Facility ID #</i>	1000 00152504
<i>Most Recent Submission</i>	Date – 06/19/2014 Anniversary Date – 06/19/2019
<i>Facility Location</i>	3700 West 190 th Street Torrance, CA 90509-2929
<i>Lat / Long</i>	33.851944/-118.331389
<i>Number of Employees</i>	627
<i>Description of Surrounding Area</i>	The facility is located in an industrial and commercial area next to a major highway (urban).

GENERAL INFORMATION AND PURPOSE

The scope of EPA's November 2016 inspection was to evaluate the Torrance Refining Company's (TRC, or Facility) implementation of its requirements under CAA Section 112(r) Risk Management Program, EPCRA Sections 302-312, and CERCLA Section 103. The inspection focused specifically on hydrofluoric acid (HF) at the refinery including the Alkylation unit (Process ID 1000052230). During the inspection, a representative of TRC's United Steel Workers (USW) union was present each day. Employee representatives were encouraged to participate in all meetings, interviews and discussions, and were available for employee interviews as requested by the EPA investigators.

Several facility tours were conducted during the inspection:

- Tour of the exterior of the HF Alkylation Unit on November 3, 2016;
- Process and Instrumentation Diagram (P&ID) field verification of process equipment within the HF Alkylation Unit on November 3, 2016;

- Visit to the control room on November 3, 2016; and
- Visit to the control room on November 4, 2016.

During the inspection, the HF Alkylation Unit was operating. The Alkylation unit is within the Program Level 3 RMP-covered process Alkylation and Light Ends.

FACILITY DESCRIPTION

TRC is owned by PBF Energy, Inc. and is located in Los Angeles County, in the city of Torrance, California. TRC acquired the refinery from ExxonMobil on July 1, 2016. The refinery produces and sells liquefied petroleum gas (LPG, propane and butane), gasoline, jet fuel, diesel, asphalt, coke, and sulfur. Products are shipped from the refinery throughout the region via truck, rail, barges, and ships. The refinery principally receives San Joaquin heavy and medium crude via pipeline and has a crude capacity of approximately 155,000 barrels per day (bpd). During the inspection, the refinery was processing crude at a rate between 130,000 and 140,000 bpd. The refinery has three flares plus a ground flare. The refinery identified in its RMP that it has the following regulated substances: flammable mixtures, propane, butane, isobutane, hydrofluoric acid (concentration 50% or greater), and anhydrous ammonia. The refinery includes eight RMP-covered processes, five of which are reported as Program Level 3, with the remainder Program Level 1.

[REDACTED]
[REDACTED] Operations Integrity Management Systems (OIMS) will remain in place (although not referred to as OIMS) until TRC transitions to new process safety management policies. [REDACTED]

[REDACTED] PBF Energy staff from the Delaware City, Delaware, refinery who attended the TRC RMP inspection stated that, unlike ExxonMobil, PBF Energy does not provide each of its subsidiary refineries with a standardized corporate management system such as OIMS, but instead allows each refinery to develop its own management system.

Since the purchase of the refinery, TRC representatives stated that 15 new senior managers were hired to replace ExxonMobil's previous senior management team. According to the refinery manager, the management team is currently focusing its initial efforts on upgrading the electrical power system that provides electricity from Southern California Edison (SCE) to the refinery. According to the refinery manager, a 27-minute electrical outage to the entire refinery that occurred on October 11, 2016, and resulted in a refinery flaring event. He stated that TRC is exploring options with SCE to prevent a future power outage, including installation of two dedicated underground 220,000-volt electrical transmission lines directly from the La Fresa substation to the refinery, and allowing the refinery to own and service the 12.8 kV transformer stations within the refinery.

The refinery includes an HF Alkylation Unit. Anhydrous HF was previously used in the alkylation process, but in the late 1990's the facility began to use a modified HF in response to a series of incidents at the refinery as part of a Consent Decree with the City of Torrance. Modified HF was implemented to improve the overall safety of the Alkylation unit. ExxonMobil believes that modifying HF with [REDACTED] results in a reduced vapor pressure and therefore, in the event of a HF release, less HF would become airborne.

RMP DOCUMENTATION AND FINDINGS

RMP Submittal

The Facility has a written Risk Management Plan. The last RMP submitted under ExxonMobil for the Torrance Refinery was June 19, 2014. TRC officially took over the Torrance Refinery on July 1, 2016. An RMP update was submitted for the TRC on August 1, 2016, updating the registration information. The TRC RMP update

provided a new refinery operator and updated facility contact information. However, the Executive Summary of the RMP still refers to ExxonMobil as the operator and refers to ExxonMobil management programs.

There are eight RMP processes listed in the most recent RMP submittal for TRC. Several processes, such as Oil Movements and Storage and Alkylation and Light Ends contain multiple chemicals and programs. All eight RMP processes include a flammable substance, and two of the RMP processes include a toxic substance. Five of the eight RMP processes reported are classified as Program Level 3 and three are classified as Program Level 1. Each RMP element reviewed is discussed below, with similar processes having the same process ID and process name

Processes:

Process ID	Process Chemical ID	Process Name	Program Level	Chemical Name	CAS Number	Quantity (pounds)
1000052228	1000063305	Cracking and Light Ends	3	Flammable Mixture	00-11-11	320,000
1000055028	1000067022	Flares, VR, and Fuel Gas	1	Flammable Mixture	00-11-11	60,000
1000052233	1000067020	Oil Movements and Storage	3	Butane	106-97-8	14,000,000
1000052229	1000063306	Hydro-processing 1	3	Flammable Mixture	00-11-11	130,000
1000052230	1000063307	Alkylation and Light Ends	3	Hydrogen Fluoride (conc 50% or greater)	7664-39-3	250,000
1000052233	1000063311	Oil Movements and Storage	3	Flammable Mixture	00-11-11	24,000,000
1000052230	1000063308	Alkylation and Light Ends	3	Flammable Mixture	00-11-11	1,800,000
1000052231	1000063309	Cokers	3	Flammable Mixture	00-11-11	100,000
1000054765	1000066676	Crude Light Ends	1	Flammable Mixture	00-11-11	250,000
1000055027	1000067017	Hydro-processing 2	1	Flammable Mixture	00-11-11	11,000
1000052229	1000066674	Hydro-processing 1	3	Ammonia, anhydrous	7664-41-7	14,000
1000052233	1000067019	Oil Movements and Storage	3	Isobutane	75-28-5	13,000,000

Process ID	Process Chemical ID	Process Name	Program Level	Chemical Name	CAS Number	Quantity (pounds)
1000052233	1000067021	Oil Movements and Storage	3	Propane	74-98-6	1,300,000

MANAGEMENT SYSTEM: 40 CFR § 68.15

TRC has an overall organizational chart that identified lines of authority and responsibilities for implementing the RMP. Since the transfer of ownership from ExxonMobil, new managerial positions have been added and the lines of authority changed. For example, a Reliability Lead position was added to the overall organizational structure.

ExxonMobil had previously used many policies and practices that were determined at its corporate headquarters and disseminated to various refineries. PBF's practice is that each individual refinery is responsible for all elements of the RMP. PBF has expertise scattered at its various refineries that it can utilize as needed; for example, individuals located at the Delaware City refinery are asked to assist in conducting Process Hazard Analysis.

TRC representatives stated that they had not conducted a Management of Organizational Change in response to the overall transfer of ownership and the subsequent creation of new managerial positions.

During the inspection, [REDACTED] stated that there was no formalized schedule for TRC to transition from ExxonMobil practices and systems for implementing the RMP, to TRC specific practices and systems. However, he indicated that changes to some practices and systems were being addressed as necessary.

HAZARD ASSESSMENT: 40 CFR §§ 68.20 – 68.42

At the time of the inspection, TRC was using the Worst Case Release Scenario (WCS) and Alternative Release Scenario (ARS) analyses that were previously conducted and submitted as part of ExxonMobil's RMP submittal for Off-site Consequence Analysis (OCA). The calculations and supporting documentation was contractually made available to TRC, but the actual analysis, calculations, and submittal was conducted by an individual who no longer works at the Torrance Refinery. During the inspection, [REDACTED] Safety Engineer, was identified as the individual responsible for the Hazard Assessment. [REDACTED] had previously worked for ExxonMobil in a similar capacity.

There are eight RMP processes, of which five include at least one Program 3 process. A summary of program levels for each process can be found in the above table.

Supporting documentation for calculations were reviewed during the inspection. TRC used EPA's RMP*Comp to calculate the endpoint distances for all toxic and flammable WCS and ARS.

In its supporting documents for the OCA, TRC did not accurately locate the butane storage sphere, which was identified as the single largest vessel for the purposes of WCS flammable modeling. Instead, Marplot printouts, TORC-EPAIX16 002512 – 002514, identify the WCS butane storage sphere within the Alkylation unit, on the west side of Crenshaw Blvd. Based on observation, the butane storage sphere is located approximately 0.5 miles away.

In addition, TRC did not report a WCS in its RMP an additional WCS for the railcars that are filled and staged at the northwest corner of the refinery. Conflicting documentation provided by the facility, TORC-EPAIX16 002519, shows that a flammable WCS for a single staged propane, butane, or isobutane railcar affects different receptors than the reported flammable WCS.

For the Toxics WCS, TRC's documentation, TORC-EPAIX16 002511, identifies the WCS endpoint for 70% hydrofluoric acid, is 2.2 miles. TRC kept the previously reported 3.2 miles due to the 11% difference between the model's HF percentage and actual HF in the process. TRC's toxic WCS determination is based on 84% HF, but actual weight percentage of HF is approximately 77% to 81%. This background data does not provide the correct RMP*Comp calculated offsite radius reported as the WCS in the RMP. If TRC had used hydrogen fluoride (anhydrous) in its modelling, it would have obtained a similar result to previous modelling.

TRC uses ExxonMobil's "rainout model" to calculate an equivalent amount of HF from modified HF, which is then input into RMP*Comp to calculate the toxic endpoint for both the toxic WCS and ARS. The calculation of an equivalent quantity is considered passive mitigation by TRC and is taken as credit when calculating the toxic WCS. The HF WCS and ARS supporting documentation does not address the real world process conditions such as the increased operating temperature and pressure, nor does it address the chemical makeup within the processes, such as the addition of hydrocarbons. Without considering these variables, modelling with the "rainout model" is not reliable.

TRC failed to determine and subsequently use the worst case release quantity of HF in the toxic WCS. Acid Settler #2 was observed to be at a height of 31 inches at the time of the inspection, but documentation, TORC-EPAIX16 002527, identifies that the WCS toxic calculation includes "a [redacted] in. administrative control on the fill level" for each acid settler. WCS supporting documentation, TORC-EPAIX16 002523 – 002525 and 002527, identifies the quantity of HF in each acid settler at a level [redacted] inches which corresponds to [redacted] pounds and the quantity of HF in the acid storage vessel as [redacted] pounds. The acid settlers normally contain 77% to 81% HF by weight, and the acid storage vessel normally contains 85% HF by weight. The fill levels for each acid settler was documented in the alkylation console shift handover logs as exceeding [redacted] inches on numerous occasions, and was identified as being as high as [redacted] inches in settler #2 on, TORC-EPAIX 002988 – 002991. The RMP identifies "release barriers and modified HF catalyst" as passive mitigation considered. RMP supporting document TORC-EPAIX 002527 identifies the WCS to be based on a "50mm hole in the acid settler." The equivalent quantity of HF reported in the Company's RMP, and used to determine the WCS is 5,200 pounds. The WCS reported quantity for HF is not consistent with the regulatory requirements found in 40 C.F.R. § 68.25(b), which state:

For substances in a vessel, the worst case release quantity shall be the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity.

To keep the modified HF catalyst at the appropriate percentage in the alkylation process, makeup or separated catalyst must be mechanically pumped into the process. The definition of mitigation, from 40 C.F.R. § 68.3 is as follows:

Mitigation or mitigation system means specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. Passive mitigation means equipment, devices, or technologies that function without human, mechanical, or other energy input. Active mitigation means equipment, devices, or technologies that need human, mechanical, or other energy input to function.

By the above definitions, mechanically pumping and monitoring HF catalyst quantities, levels, or percentages is not a passive mitigation, as it requires human involvement.

EPA has previously addressed the issue of using an acid aerosol reducing additive as passive mitigation, which can be found at:

<https://emergencymanagement.zendesk.com/hc/en-us/articles/211413968-Acid-aerosol-reducing-additive-as-passive-mitigation>

According to the above reference, the use of modified catalyst as passive mitigation to reduce the WCS HF quantity to a calculated "equivalent," is not consistent with the regulatory requirements.

PROCESS SAFETY INFORMATION: 40 CFR § 68.65

Safe Upper and Lower Limits

The inspection team reviewed the safe operating limits for the HF Alkylation Unit (TORC-EPAIX16 000303 – 000317). This document includes an equipment description, operating limits, consequences, rationale, guidance for the console operator to correct conditions outside operating limits, and the basis for the limits. Examination of the safe operating limits for the HF Alkylation Acid Settler No. 1 indicates the acid level in the settler should remain between [REDACTED] inches. The consequence of acid levels increasing above [REDACTED] inches is acid entrainment into the hydrocarbon phase, resulting in severe tower tray corrosion and plugging. The refinery has classified this situation as a Tier 1 environmental loss. A review of document TORC-EPAIX16 000307 provides no additional rationale for the administratively controlled acid level of [REDACTED] inches in Acid Settler No. 1 other than "Consent Decree?". A review of the safe operating limits for HF Acid Settler No. 2 indicates the justification for the upper acid level is "Consent Decree?", but does not mention acid entrainment and severe tower tray corrosion and plugging.

[REDACTED] an Alkylation unit Console Operator, was asked about settler levels and associated alarms. Settler No. 1 was at [REDACTED] inches at the time of the inspection and according to [REDACTED], has a high level alarm at [REDACTED] inches and a high-high alarm at [REDACTED] inches. Settler No. 2 was also at [REDACTED] inches and has alarm set points of [REDACTED] inches and [REDACTED] inches. Several times during the inspection, facility representatives stated that the Alkylation unit's settlers were administratively controlled at a combined total height of [REDACTED] inches. There were no alarms associated with this combined level, and it was observed that this administrative limit is not actually followed, nor was it observed in any TRC SOP.

The settler levels are reported every 12 hours from the field using a magnicator reading, but the level is also monitored via the Alkylation unit console using separate internal level indicators. Occasionally there may be a discrepancy between the values in the field and on the console, at which time a work order is issued to calibrate the level indicators.

The modified HF fresh acid vessel, 5C-31, has [REDACTED] level indicators, a magnicator in the field and a [REDACTED] level indicator to the Alkylation unit console. The magnicator is the device used for compliance monitoring. [REDACTED] stated that 5C-31 has [REDACTED] set alarm points, high-high at [REDACTED] inches, high also at [REDACTED] inches, low at [REDACTED] inches and low-low at [REDACTED] inches. Operating procedures for the offloading of modified HF identified that the maximum liquid height in 5C-31 is not to exceed [REDACTED] inches, which is equivalent to [REDACTED] gallons. For modified HF in 5C-31, [REDACTED] inches is identified as that the limit of the mitigation system. It was observed that on several occasions since July 1, 2016, that the quantity of modified HF in 5C-31 was recorded as [REDACTED] inches, and one case where the quantity was recorded as [REDACTED] inches. Alarm history shows that 5C-31's level alarm was activated on multiple occasions with recorded values as low as [REDACTED] inches, and only showed the low alarm at [REDACTED] inches, no alarm for below [REDACTED] inches was observed in the alarm history.

Piping and Instrumentation Diagrams (P&IDs)

The inspection team performed a P&ID field verification within the HF Alkylation Unit. Specifically, the inspection team field verified portions of P&ID drawing numbers 05A0106D01, rev. 19 (TORC-EPAIX16-000191) and 05A0141D01, rev. 17 (TORC-EPAIX16-000121). The inspection team identified the following areas of concern:

- The inspection team found that a local pressure indicator noted on the P&ID 05A0106D01 was not installed on the nitrogen purge line to the 1st Stage Acid Settler, 5C-38 (TORC-EPAIX-000191).
- The inspection team observed two manual valves that were locked on the nitrogen line to the 1st Stage Acid Settler 5C-38, but no indication was provided on P&ID 05A0106D01 that these valves were to be locked (TORC-EPAIX16-000191).

Electrical Classification

The inspection team reviewed the refinery's electrical classification diagram for the HF Alkylation Unit.

Relief System Design and Design Basis

TRC relies on pressure safety valves (PSVs) to prevent over-pressurization of process vessels and associated piping within the HF Alkylation Unit. All PSVs within the HF Alkylation Unit discharge to the relief gas scrubber to prevent the release of HF acid to the atmosphere. To evaluate the design integrity of PSVs within the HF Alkylation Unit, the inspection team requested PSV design datasheets for three PSVs; two associated with the acid evaluation drum D5C-54 (TORC-EPAIX16-001780 and TORC-EPAIX16-001781) and one with the acid storage drum D5C-31 (TORC-EPAIX16-001780). The data sheets for each PSV included information on relief valve manufacturer and model, piping connections, materials of construction, the design basis for the relief valve, and the fluid data. Comparing the design information, fluid data, and the relief valve set pressures with the American Petroleum Institute (API) 521 standards¹ for preventing vessel over-pressurization confirmed the designs appeared to be adequate.

Design Codes and Standards

During the field inspection of the HF Alkylation Unit, the HF acid storage drum D5C-31, and the acid evacuation drum D5C-54 were inspected to determine if nameplates were present and if the information on the nameplates were accurate.

Vessel D5C-31 is a carbon steel, [REDACTED] foot inside diameter, [REDACTED] foot long cylindrical pressure vessel that is used to store as much as [REDACTED] gallons of 85 percent HF acid prior to use in the HF Alkylation Unit (TORC-EPAIX16-000121). Review of the ASME Section III nameplate information affixed to vessel D5C-31 determined the vessel was constructed in 1943 and to have a maximum allowable working pressure (MAWP) of [REDACTED] psig. According to P&ID 05A0141D01 (TORC-EPAIX16 – 000121), the design pressure for this vessel is also [REDACTED] psig, and the two process safety valves (PSVs) designed to protect the vessel from overpressure are set at [REDACTED] psig. Discussions with refinery staff suggested the vessel was likely repurposed from another process since the HF Alkylation Unit was not located at the refinery in 1943. The original purpose of the tank is unknown. A second National Board Inspection Code (NBIC) nameplate was also affixed to the vessel due to an internal inspection and subsequent welding to replace corroded equipment in 2010. A new NBIC nameplate was not affixed to the vessel for the replacement of a welded vessel nozzle in May 2016.

Vessel D5C-54 is a carbon steel, [REDACTED] foot inside diameter, [REDACTED] foot long cylindrical pressure vessel used to store as much as 46,000 gallons of either 85 percent HF acid or dilute HF acid (>50% w/w) acid (TORC-EPAIX16-000117). Vessel D5C-54 is primarily used for temporary storage of HF acid from the Alkylation unit when the Alkylation unit must be emptied of HF acid during maintenance, turn-arounds or in emergency situations. No nameplates were affixed to vessel D5C-54 and, therefore, the MAWP, maximum allowable working temperature (MAWT) and the year the tank was manufactured could not be confirmed. P&ID 05A0140D01, rev. 22 (TORC-EPAIX16-000117) indicates the design pressure for the vessel D5C-54 is [REDACTED] psig and the design temperature of [REDACTED]. P&ID 05A0140D01, rev. 22 also indicates the vessel is protected from overpressure by two PSVs, both set at [REDACTED] psig. TRC provided a photograph of the nameplate for 5C-54, TORC-EPAIX 002842, and form U1-A for 5C-54, as part of its response to documents requested during the inspection.

Material and Energy Balances

The EPA inspection team discussed material and energy balances for the HF Alkylation Unit with the unit's process engineer and requested documentation for both. TRC stated that it does not run or have an energy balance

¹ American Petroleum Institute 521 Pressure Relieving and Depressuring Systems, Fifth Edition, 2007.

for the Alkylation unit. A material balance was provided that shows that the Alkylation unit will run at greater than 81% HF and approximately 5% Sulfolane.

Safety Systems

The HF Alkylation Unit has safety systems for the HF control. These safety systems include HF sensors, alarms, cameras, flame detectors, a water deluge system, and automatic block valves. The inspection team requested a list of safety critical devices within the HF Alkylation Unit (TORC-EPAIX16 000678 through 000681) and was provided a list of equipment, the P&ID the equipment is found on, if the equipment was tested during the last turn-around, the date the equipment was last tested, and the testing frequency. Analysis of the dates the equipment was last tested and the testing frequency indicated that some safety system equipment such as pushbuttons to manually operate the water deluge systems and block valves are not being tested (TORC-EPAIX16-000679). Based on a review of documents, other critical electrical equipment included in the list of safety systems was also not being tested at the prescribed frequency (TORC-EPAIX16-000680 and TORC-EPAIX16-000681). Pressure relief valve [REDACTED] for protection of the acid evacuation systems 5C-54 vessel was identified on the alkylation console shift handover logs as being critical equipment. Based on those same logs, the relief valve was bypassed from July 1, 2016, until the day of the inspection. The safety systems sheet identifies that this pressure relief device be tested every 48 months. Documentation indicated that such testing had not occurred since a 2010 turn around.

Review of alkylation console shift handover logs and available operating procedures identified that several critical safety systems and equipment were bypassed or deactivated on multiple occasions for extended periods of time. This occurred both during the offloading of modified HF and during day to day operations.

For example, during the offloading of modified HF, operating procedure [REDACTED] alarm deactivation history, and alkylation console shift logs identified that safety systems were not operating appropriately and trailers of modified HF were nonetheless offloaded.

PROCESS HAZARD ANALYSIS: 40 CFR § 68.67

TRC representative [REDACTED] and PBF representative [REDACTED] were interviewed regarding the PHA. At the time of the inspection, TRC had not conducted a PHA for any of the processes that contained HF. The previously completed PHAs, including documentation were based on the "knowledge based HAZOP", but that methodology was not being used by TRC. TRC indicated that it planned to use the more frequently used guide word Hazard and Operability analysis (HAZOP) methodology, starting with the first PHA since taking ownership. Mr. Napit and Mr. Greenfield stated that TRC planned to use the five year PHA revalidation cycle that was developed by ExxonMobil to update the PHAs and include a Layers of Protection Analysis.

There are two separate PHAs conducted to cover the Alkylation unit. The two most recent PHAs in the five-year cycle were conducted in January 2013 and August 2014. The existing schedule that TRC is using identifies the next Alkylation unit PHAs will be conducted in 2018 and 2019.

STANDARD OPERATING PROCEDURES (SOPs): 40 CFR § 68.69

During the inspection, [REDACTED] an Alkylation Unit Console Operator, was interviewed regarding operating procedure OM-05-306 – *Alkylation Unit Alkylation Emergency Shutdown (ESD) Procedure (rev4, 2/1/16)*, TORC-EPAIX161756-1768. The procedure is used when there is a loss of primary containment, loss of cooling water, loss of power, loss of flush to pump, total loss of control, or loss of instrument air. The procedure was used during the loss of power in October 2016.

The hardcopy of procedure OM-05-306 located in control room in the *Alky/DIB SHE Critical & Emergency* binder was Rev 4, dated 9/15/13 (see TORC-EPAIX16 002488-2491), which was a different date than the hardcopy provided by TRC management during the inspection (2/1/16).

Operating procedure OM-05-306 indicates that level C Personal Protective Equipment (PPE) is required, but this may be upgraded to the next level for an unplanned event. The console operator stated that Level A, not B would be used during a loss of containment, neither of which are indicated in the operating procedure.

The procedure does not clearly indicate who is involved with completing the steps of initiating the emergency shutdown, specifically the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.

The operating procedures steps, up to step 3.4, were reviewed with [REDACTED]. During the review, it was observed that some steps contained incorrect information or lacked sufficient information. These are as follows:

- In steps 1.3 & 1.4 the operating procedure read, "Close isolation and bypass valves for [REDACTED] and [REDACTED]" and "Close isolation and bypass valves for [REDACTED]". However, per the console operator, the control valves may be closed from the DCS, but it is the responsibility of the field operators to close related isolation valves. For both of these two steps, the board operator indicated that the bypass valves should already be closed.
- A note above Step 2.0 includes an action that should be described as a separate step, "IMPLEMENT THE EMERGENCY FLUSH SYSTEM," rather than a note. In addition, this step does not address that there are conditions when the emergency flush system may not need to be implemented until a later time.
- Step 2.1 reads, "Close [REDACTED] control valve", but a note in the procedure immediately prior to step 2.1 indicates that the valve should not be closed but rather [REDACTED] WILL ONLY BE OPENED A NOMINAL AMOUNT TO ENSURE THERE IS FLOW." The operator indicated that the note is correct and the step 2.1 is inaccurate.
- FC05031 is opened, closed and opened again from 2.0 to step 2.3. This is unclear. The final step, 2.3, is unclear as it gives instructions to "set at minimum flow rate," but there is no actual minimum flow rate indicated.
- Step 2.4 reads, "Allow level to build in isostripper bottoms..." but there are no values given. Per the board operator, as long as the level is increasing, then it is good.
- Step 3.0 includes a note that "the alkylate water wash and drying facilities in Unit 10 will have to go into an internal recycle operation as defined in...". No further instructions are given on when in the procedure this is to be initiated or by whom. This appears to be more of a required step than a note.
- After Step 3.1, there is a note indicates that "IF YES, IGNORE STEP 3.2-3.4 AND 4.1-4.5." The note should also indicate that it is dependent on steam availability, and only if maintaining control of the stabilizer tower is not possible.

During the inspection [REDACTED] Alkylation Unit Console Operator was interviewed about operating procedure, OM-05-008 Alkylation Unit 6V39 #2 Regenerator Startup & SOP (Rev 9 7/8/2016). The procedure is for startup of the acid regenerator (5C39) after a turnaround or other shutdown, including when the unit is placed in hot standby. This procedure was used for startup following the October 2016 loss of power. This procedure is labeled as a "SHE critical" procedure. The acronym SHE represents Safety Health and Environmental.

During the review of the operating procedure, pressure relief for the #2 regenerator (5C39) was identified as being dependent on the Isostripper overhead pressure controller [REDACTED] which is used for process control. The pressure relief for 5C39 is therefore not independent. The #2 regenerator vessel and its associated piping appears to rely on engineering and administrative controls (i.e., control valves, carseals and operator verification to ensure 5C39 overhead valves are open) for pressure relief. Failure in the engineering or administrative controls, such as

failure of [REDACTED] could result in a loss of containment of HF. Passive mitigation such as a pressure relief device is the RAGEGEP per API 520, API 510, and ASME Section VIII. The procedure identifies 5C39 as having no PRVs.

Normal operating conditions are provided on pages 11 through 13 of operating procedure OM-05-008, which appears to be the "SOP" part of the procedure as titled. This part of the procedure provides a table with target variables, such as "HF Acid Preheat", deviations such as "High" or "Low," consequences, and steps to correct deviation. The majority of the targets, deviations, consequences and steps to correct deviation do not include actual operating high/low limits. For instance, for the target of "HF Acid Preheat" and deviation of "High," the consequence is "HF acid purity decreases". There are no quantities associated with the limits, only the steps to correct deviations such as "Decrease preheat. Do not decrease more than [REDACTED] PF at any one time...." The table does not include information on what quantity is "High HF Acid Preheat," or what values during "HF acid purity decreasing" are a concern.

At the time of the inspection, it was observed that completed and signed operating procedures were being maintained in the control room. Operating procedure OM-10-003 for the *Safe Start-up and Continuous Operation of the Deisobutanizer Section and Associated Equipment*, which was completed on 10/16/2016, did not have any completion information or signatures for any of the steps associated with tasks one through six. Some steps in tasks seven through sixteen did not have a signature. OM-10-003 is identified as a non-routine procedure for which the operating procedure must be signed off and returned to the supervisor upon completion.

Operating procedure OM-05-025, the *Alkylation Unit Acid Evacuation System Test Procedure*, was completed multiple times since July 1, 2016. It was observed that there were sections in all procedures that were not signed off during the completion of each test. Steps 5.1 through 5.12 for example, were left blank on each completed operating procedure.

The operating procedure OM-05-005, *Unloading to 5C-31*, does not have a completed operating procedure for July 30, 2016 through September 2, 2016, during which time there were four modified HF deliveries. The operating procedure was completed without action number 9.1 being signed off, which is an action to verify the alarm for safety shower #7. The alkylation console shift handover logs and deactivated alarm list identifies that safety shower # 7 was having issues for several months and an alarm associated with the shower was deactivated. This is not reflected in the operating procedures. The completed unloading procedure also had instances of safeguards, including remote fire water monitor system and cameras that were identified as not working. TRC documentation did not identify any alternate safeguards or changes to the procedures on these occasions.

MECHANICAL INTEGRITY: 40 CFR § 68.73

The EPA inspection team interviewed the Lead Inspector [REDACTED] and the Light Oils Inspector [REDACTED] to discuss inspections of the Alkylation unit. [REDACTED]

[REDACTED] TRC is contracting with Equity Engineering to prepare new EDDs and GIPs. Equity Engineering will use legacy Shell documents to update and improve upon, to develop the TRC documents.

TRC will continue to use the [REDACTED] database for storing equipment strategies, which is the database ExxonMobil used at the Torrance Refinery. TRC uses contractors to perform API 510 inspections, radiography, and thickness measurements. After completing their inspections and measurements, the contractors prepare a report and submit it to the TRC Inspection Planner for entry into the [REDACTED]. The Inspection Planner enters the data into [REDACTED] and emails the report to the TRC Unit Inspector. The [REDACTED] (an Excel tool) pulls data from [REDACTED] to summarize upcoming inspections and other activities. The Light Oils Business Team and unit inspector meet weekly to discuss inspections for the Alky Unit.

The [REDACTED] database houses duplicate data as [REDACTED]. [REDACTED] contains risk calculations and mitigation actions. Only the TRC reliability engineers have access to edit or add data to [REDACTED].

TRC is currently evaluating its underground piping. The EPA inspection team interviewed Inspection Engineer Patrick Tibbett who is overseeing this project. All of the refinery's underground piping is mapped, and TRC has prioritized the underground lines for evaluation. LPG lines are the top priority. The underground LPG lines are in the LPG storage area (Unit 52). There are a total of 15 piping circuits in Unit 52, and TRC is evaluating 12 of these piping circuits for underground piping. [REDACTED] walked-down each of the individual 125 isometric drawings covering these 12 piping circuits and made recommendations for inspection. Each inspection involves excavating and visually examining the recommended piping for inspection. Pigging is not being performed. TRC has completed excavating approximately 70 percent of the 12 piping circuits. Contractors are performing ultrasonic testing (UT) and pit gauging. TRC is thus far anticipating replacing 14 pipe segments. For pipe segments that will be replaced, TRC plans to run the replacement pipe aboveground instead of buried. Unit 52 piping circuits are included in the equipment strategies and are on a Risk Based Inspection schedule. Some underground piping within the facility is on an API 570 time-based inspection schedule, but will be transitioned to RBI schedules as equipment strategies are developed for them. TRC began the Unit 52 LPG underground piping evaluation around February to March of 2016 and planned to complete the LPG phase of the project by the end of 2016 provided the scope does not expand based on the findings.

MANAGEMENT OF CHANGE AND PRE-START-UP SAFETY REVIEW: 40 CFR § 68.75 AND § 68.77

These elements of the RMP were not evaluated during the inspection. The lack of evaluation does not imply there are or are not concerns as these elements may undergo further review.

INCIDENT INVESTIGATION: 40 CFR § 68.81:

This element of the RMP was not evaluated during the inspection. The lack of evaluation does not imply there are or are not concerns as these elements may undergo further review. Documentation was requested during the inspection to identify potential HF near miss incidents for which TRC potentially should have conducted an incident investigation.

TRAINING, COMPLIANCE AUDITS, EMPLOYEE PARTICIPATION, CONTRACTORS, AND EMERGENCY RESPONSE: 40 CFR § 68.71, § 68.79, § 68.83, § 68.87, § 68.95:

These elements of the RMP were not evaluated during the inspection. The lack of evaluation does not imply there are or are not concerns as these elements may undergo further review.

EPCRA §§ 302-312

No additional Tier II reports were required to be submitted at the time of the inspection. This was not evaluated further by EPA during this inspection.

EPCRA §304/CERCLA §103

TRC's overall release reporting program remained the same as when the facility was ExxonMobil. Facility representatives stated that there have been no HF reportable releases since TRC acquired the facility. Other reportable releases have been made since, but those were not reviewed in detail during this inspection.

POTENTIAL VIOLATIONS

Chemical Accident Prevention Provisions, 40 C.F.R. Part 68, Subpart A – General

1. **Management – 40 CFR § 68.15(a):** *The owner or operator of a stationary source with processes subject to Program 2 or Program 3 shall develop a management system to oversee*

the implementation of the risk management program elements.

Based on interviews and the review of related documents, the TRC RMP management system does not appear to be sufficiently defined or cohesively structured to fulfill adequate oversight and implementation of the Risk Management Program.

At the time of the inspection, TRC's overall management structure at the Facility was different from that of ExxonMobil, its prior owner. New positions, such as the addition of a Reliability Department Manager, are substantively different than the management system as it appears in the RMP, and therefore does not reflect TRC's implementation of the RMP elements. Furthermore, a Management of Organizational Change or similar analysis was not conducted to ensure that Risk Management and process safety responsibilities for changing positions was not lost during the transition, or are accurately reflected in the RMP.

According to the Refinery Manager, at the time of the inspection, TRC had several different RMP management system document sources including: pre-existing ExxonMobil RMP and process safety information; RMP related documents purchased from another refiner; and PBF Energy's own specific policies and procedures. TRC offered no schedule or plan for the consolidation, transition, harmonization or implementation of these various components of its RMP. The result is a stated management system that appears superficial, and does not sufficiently describe TRC's actual management system structure.

2. Management – 40 CFR § 68.15(c): *When responsibility for implementing individual requirements of this part is assigned to persons other than the person identified under paragraph (b) of this section, the names or positions of these people shall be documented and the lines of authority defined through an organization chart or similar document.*

Based on the inspection team's review, TRC did not document each individual responsible for implementing the elements of the RMP. For example, TRC's August 1, 2016 RMP update identified [REDACTED] Safety Engineer, as the person responsible for Part 68 implementation. However, during the inspection, several different facility representatives were identified as having the responsibility for implementing RMP elements. TRC did not offer an organizational chart that correctly identified this matrix of responsibilities as required by this subpart.

Chemical Accident Prevention Provisions, 40 C.F.R. Part 68, Subpart B – Hazard Assessment

3. Worst Case Release Scenario Analysis – 40 C.F.R. § 68.25(b)(1): *For substances in a vessel, [The worst-case release quantity shall be the...] greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity.*

Based on the inspection team's review of the OCA supporting documentation, TRC did not accurately determine and subsequently use the worst case release quantity of hydrofluoric acid in the toxic Worst Case Scenario analysis ("WCS"). Errors in several independent elements have the potential to impact the actual maximum quantity that should be used in the OCA and subsequently the predicted offsite consequence. For example:

- a. In document TORC-EPAIX16 002527, TRC identifies that the WCS toxic determination includes an administrative control on the fill level for each acid settler. TRC represents that an administrative level corresponds to the RMP reported vessel amount. However, at the time of the inspection, Acid Settler #2 was observed to be at a height exceeding the stated administrative

control level. Additional review of on-site logs indicate that the Acid Settler level was regularly at a height exceeding the administrative control lever and on at least one occasion significantly higher (October 9, 2016). If the acid settler operates at a higher level than the RMP OCA documentation identified administrative control level, the administrative control is not functioning to limit the maximum quantity in the vessel, and the release quantity used for calculation of the toxic WCS must be correspondingly higher. As such the reported settler quantity used in the modeling appears to be inaccurate.

- b. Toxic WCS calculations provided in document TORC-EPAIX16 002523 identify the quantity of HF in each acid settler. The quantity of HF in the acid storage vessel is identified to be more than the quantity in each acid settler. For the purposes of the WCS OCA, TRC selected the volume in a single acid settler as the largest “single vessel” in the calculation. However, the quantity of HF reported in TRC’s most recent RMP, and used to determine the WCS, is only 5,200 pounds, and not the higher volume contained in either acid settler. The RMP identifies “release barriers and modified HF catalyst” as passive mitigation considered. TRC subsequently used the described passive mitigation as justification for reducing the amount of HF in the WCS calculations to an HF equivalent. Such an approach is not consistent with the regulatory requirements found in 40 C.F.R. § 68.25(b) as described above.

Furthermore, the acid storage vessel quantity that TRC used is larger than the quantity in the settler.

- c. According to TRC, to keep the modified HF catalyst at the appropriate percentage in the alkylation process, makeup or separated catalyst must be mechanically pumped into the process. TRC subsequently claims that the HF modification process serves as passive mitigation. However, based on inspection team review this does not appear to be the case. The definition of mitigation, from 40 C.F.R. § 68.3, is as follows:

Mitigation or mitigation system means specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. Passive mitigation means equipment, devices, or technologies that function without human, mechanical, or other energy input. Active mitigation means equipment, devices, or technologies that need human, mechanical, or other energy input to function.

Based on this definition, mechanically pumping and monitoring modified HF catalyst quantities, levels, or percentages is not passive mitigation, as it requires human, mechanical or other energy input to function. EPA has previously addressed the issue of using an acid aerosol reducing additive as passive mitigation, which can be found at:

<https://emergencymanagement.zendesk.com/hc/en-us/articles/211413968-Acid-aerosol-reducing-additive-as-passive-mitigation>

- d. The inspection team observed that TRC used EPA’s RMP*Comp model to determine the WCS endpoint. In that determination, TRC appears to have erroneously selected a percentage of hydrofluoric acid as the modeling chemical instead of selecting anhydrous hydrofluoric acid. Such an error reduces the accuracy of the model and is an incorrect application. The issue is further confused by TRC’s selection of an endpoint of 3.2 miles for which they offer no clear basis.
4. **Worst Case Release Scenario Analysis –40 C.F.R. § 68.25(a)(2)(iii): Additional worst-case release scenarios for a hazard class if a worst-case release from another covered process at the**

stationary source potentially affects public receptors different from those potentially affected by the worst-case release scenario developed under paragraphs (a)(2)(i) or (a)(2)(ii) of this section.

Inspection team members evaluated documents and maps related to all of TRC's RMP regulated processes. Based on those reviews TRC did not report a WCS for the railcars that are filled and staged at the northwest corner of the refinery. The flammable WCS for a staged railcar affects different receptors than the reported flammable WCS. Following EPA's review, it appears that TRC incorrectly determined that no additional offsite receptors are impacted by railcar OCA results.

5. **Worst Case Release Scenario Analysis – 40 C.F.R. § 68.30(a):** *The owner or operator shall estimate in the RMP the population within a circle with its center at the point of the release and a radius determined by the distance to the endpoint defined in §68.22(a).*

Based on a review of documents, it appears that TRC did not correctly identify the center point location of the butane storage sphere, which is identified as the flammable WCS. As a result, the OCA does not accurately identify the off-site receptors and affected population.

Chemical Accident Prevention Provisions, 40 C.F.R. Part 68, Subpart D – Program 3 Prevention Program

6. **Process Safety Information – 40 C.F.R. § 68.65(d)(1)(ii):** *Piping and instrument diagrams (P&ID's)*

TRC did not adequately identify instrumentation, piping, and valve configurations on P&IDs. During the inspection, it was observed that P&ID 05A0106D01, rev. 19 (TORC-EPAIX16-000191) did not match the equipment in the field. For example, two pressure indicators and manual valves were not listed on the P&IDs.

7. **Process Safety Information – 40 C.F.R. § 68.65(d)(1)(vi):** *Design codes and standards employed*

During the field inspection of the HF Alkylation Unit, pressure vessel D5C-31 was inspected to determine if nameplates were present and if the information on the nameplates were accurate. Review of the nameplate information affixed to vessel D5C-31 found no National Board Inspection Code (NBIC) nameplate affixed to the vessel for the replacement of a leaking vessel nozzle in May 2016. Section 5.7.2(c) of the NBIC Part 3, Section 5.7.2 (Stamping Requirements for Repairs) requires the stamping or nameplate be applied adjacent to the original or manufacturers nameplate for repairs to pressure vessels and that the stamping or nameplate include the date of the repair that corresponds with the date on associated Form R-1.

8. **Operating Procedures – 40 C.F.R. § 68.69(a):** *The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and*

shall address at least the following elements.

Based on a review of documents, TRC did not fully implement its operating procedures to safely conduct HF-related activities, including but not limited to the unloading of HF. For example: TRC did not produce completed and signed operating procedures for the four unloadings of HF from July 30, 2016 through September 2, 2016. In other instances, operating procedures were observed to not be completely signed off as required and did not include a justification or explanation for why certain steps were incomplete.

In some instances, safeguards such as fire water monitor systems, safety shower alarms and cameras were identified in handover logs as not working during HF unloading. TRC documentation did not identify any alternate safeguards or changes to the procedures on these occasions.

9. Operating Procedures – 40 C.F.R. § 68.69(a)(1)(iv): *Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.*

At the time of the inspection, the emergency operating procedure OM-05-306, available in the control room, did not clearly indicate who is involved with completing the steps, specifically the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.

10. Operating Procedures – 40 C.F.R. § 68.69(a)(2)(i) – (ii): *Consequences of deviation; and steps required to correct or avoid deviation.*

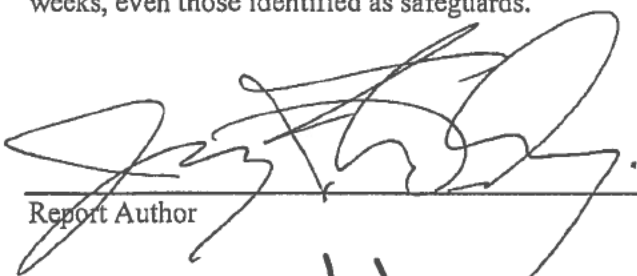
TRC did not include operating limits within operating procedure [REDACTED] for the unloading of HF to 5C-31. Several steps in the operating procedure include specific direction (TORC-EPAIX 004196), but there are no operating limits identifying what is otherwise acceptable, nor are there any steps required to correct or avoid deviation.

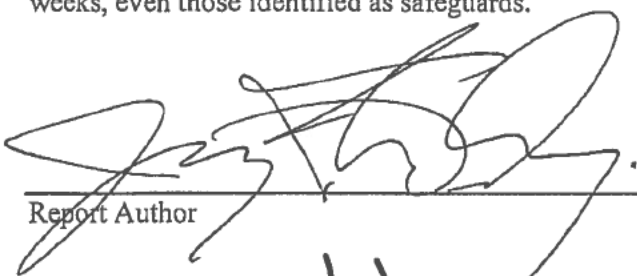
11. Mechanical Integrity – 40 CFR § 68.73(d)(3): *The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience.*

In a number of instances, TRC did not test critical safety systems, including pushbutton water deluge systems and critical electrical equipment within the HF Alkylation Unit, at the identified frequency documented on the list of critical safety systems for the Alkylation unit, TORC-EPAIX16 000678 – 000681.

12. Mechanical Integrity – 40 CFR § 68.73(e): *The owner or operator shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in §68.65) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.*

TRC did not correct deficiencies in equipment that were identified as being outside of an acceptable operating range in a safe and timely manner. Safety systems and equipment within the Alkylation unit were identified as being non-operational on a recurring basis. Some were not fixed for multiple weeks, even those identified as safeguards.


Report Author


3/31/2017
Date

Reviewed by:


3/31/17